

WHAT IS CLAIMED IS:

1. A combustion vibration estimating apparatus wherein a mathematical model for explaining internal pressure variation is constructed from plant data and weather data,
5 a combustion vibration-prone to be generated region and a combustion vibration-less prone to be generated region are obtained based on the constructed mathematical model and are output.
- 10 2. A combustion vibration estimating apparatus comprising:
 - an inputting unit which inputs limiting values of plant data, weather data and internal pressure variation,
 - an internal pressure variation characteristic
 - 15 grasping unit which makes internal pressure variation of a combustor into a mathematical model from the input plant data and weather data,
 - a combustion vibration region estimating unit which applies a limiting value of the internal pressure variation
 - 20 to the mathematical model obtained by the internal pressure variation characteristic grasping unit to obtain combustion vibration-prone to be generated region, and
 - an outputting unit which outputs a combustion vibration region estimation result by the combustion
 - 25 vibration region estimating unit.

3. The combustion vibration estimating apparatus according to claim 2, further comprising a database which stores the plant data and the weather data input by the inputting unit into a time series, wherein the internal pressure variation characteristic grasping unit obtains data from the database to make the internal pressure variation of the combustor into the mathematical model.
4. A combustion vibration estimating apparatus comprising:
- an inputting unit which inputs plant data and weather data,
 - an internal pressure variation estimating unit which estimates internal pressure variation of a combustor from the input plant data and weather data, and
 - an outputting unit which outputs internal pressure variation estimation result estimated by the internal pressure variation estimating unit.
5. The combustion vibration estimating apparatus according to claim 4, further comprising a database which stores the plant data and weather data input by the inputting unit, wherein the internal pressure variation estimating unit estimates estimated value of the internal pressure variation by data of latest time stored in the database.

6. A combustion vibration estimating apparatus wherein a mathematical model for explaining internal pressure variation and NOx discharge amount is constructed from plant data and weather data, a combustion vibration-prone to be generated region and a combustion vibration-less prone to be generated region are obtained based on the constructed mathematical model and are output.

7. A combustion vibration estimating apparatus comprising:

an inputting unit which inputs limiting values of plant data, weather data and internal pressure variation, as well as a restricting value of NOx,

an internal pressure variation characteristic grasping unit which makes internal pressure variation of a combustor into a mathematical model from the input plant data and weather data,

a NOx discharge amount characteristic grasping unit which makes an NOx discharge amount into a mathematical model from the input plant data and weather data,

a safe region estimating unit which applies a limiting value of the internal pressure variation to the mathematical model obtained by the internal pressure variation characteristic grasping unit, and applies a restricting value of the NOx to the mathematical model obtained by the

NOx discharge amount characteristic grasping unit, thereby obtaining a region where the NOx discharge amount is equal to or less than the restricting value and the combustion vibration is less prone to be generated, and

5 an outputting unit which outputs a safe region estimation result by the safe region estimating unit.

8. A combustion vibration estimating apparatus wherein a mathematical model for explaining internal pressure
10 variation, NOx and a CO discharge amount is constructed from plant data and weather data, a combustion vibration-prone to be generated region and a combustion vibration-less prone to be generated region are obtained based on the constructed mathematical model and are output.

15

9. The combustion vibration estimating apparatus comprising:

 an inputting unit which inputs limiting values of plant data, weather data and internal pressure variation, as well
20 as restricting values of NOx and CO,

 an internal pressure variation characteristic grasping unit which makes internal pressure variation of a combustor into a mathematical model from the input plant data and weather data,

25 a NOx discharge amount characteristic grasping unit

which makes an NOx discharge amount into a mathematical model from the input plant data and weather data,

a CO discharge amount characteristic grasping unit which makes an CO discharge amount into a mathematical model from the input plant data and weather data,

a safe region estimating unit which applies a limiting value of the internal pressure variation to the mathematical model obtained by the internal pressure variation characteristic grasping unit, applies a restricting value of the NOx to the mathematical model obtained by the NOx discharge amount characteristic grasping unit, and applies a restricting value of the CO to the mathematical model obtained by the CO discharge amount characteristic grasping unit, thereby obtaining a region where the NOx discharge amount and the CO discharge amount are equal to or less than the restricting value and the combustion vibration is less prone to be generated, and

an outputting unit which outputs a safe region estimation result by the safe region estimating unit.

10. A combustion vibration estimating apparatus comprising:

an inputting unit which inputs limiting values of plant data, weather data and internal pressure variation, as well as restricting values of NOx and CO,

a focus setting unit which selects data used for making a mathematical model from the input plant data and weather data,

an internal pressure variation characteristic grasping unit which makes internal pressure variation of a combustor into a mathematical model from the selected plant data and weather data,

a discharge amount characteristic grasping unit which makes NOx and CO discharge amounts into a mathematical model from the selected plant data and weather data,

a safe region estimating unit which applies a limiting value of the internal pressure variation to the mathematical model obtained by the internal pressure variation characteristic grasping unit, applies restricting values of the NOx and CO to the mathematical models obtained by the NOx and CO discharge amount characteristic grasping unit, thereby obtaining a region where the NOx discharge amount and the CO discharge amount are equal to or less than the restricting value and the combustion vibration is less prone to be generated, and

an outputting unit which outputs a safe region estimation result by the safe region estimating unit.

11. The combustion vibration estimating apparatus according to claim 10, wherein the focus setting unit selects the plant data and weather data input from the inputting unit based on a region or a setting mode designated by the
5 inputting unit.

12. A combustion vibration estimating apparatus comprising:

an inputting unit which inputs limiting values of plant
10 data, weather data and internal pressure variation, as well as restricting values of NOx and CO,

a focus setting unit which selects data used for making a mathematical model from the input plant data and weather data,

15 an internal pressure variation characteristic grasping unit which makes internal pressure variation of a combustor into a mathematical model from the selected plant data and weather data,

a discharge amount characteristic grasping unit which
20 makes NOx and CO discharge amounts into a mathematical model from the selected plant data and weather data,

a safe region estimating unit which applies a limiting value of the internal pressure variation to the mathematical model obtained by the internal pressure variation
25 characteristic grasping unit, applies restricting values

of the NOx and CO to the mathematical models obtained by the NOx and CO discharge amount characteristic grasping unit, thereby obtaining a region where the NOx discharge amount and the CO discharge amount are equal to or less than the restricting value and the combustion vibration is less prone to be generated,

a proposed adjustment generating unit which obtains a point to be measured next, using a safe region estimation result by the safe region estimating unit, and

an outputting unit which outputs a safe region estimation result by the safe region estimating unit and a point to be measured by the proposed adjustment generating unit.

13. The combustion vibration estimating apparatus according to claim 12, wherein the focus determining unit determines a next focus based on the mathematical model obtained based on plant data and weather data selected by determination of a last focus.

20

14. A plant comprising:

a combustor, and

a combustion vibration estimating apparatus which constructs a mathematical model which explains internal pressure variation from plant data and weather data which

are obtained with combustion in the combustor, and obtains and outputs a combustion vibration-prone to be generated region and a combustion vibration-less prone to be generated region based on the constructed mathematical model.

5

15. A plant comprising:

a combustor, and

a combustion vibration estimating apparatus having an inputting unit which inputs limiting values of plant data,
10 weather data and internal pressure variation obtained with combustion in the combustor, an internal pressure variation characteristic grasping unit which makes internal pressure variation of a combustor into a mathematical model from the plant data and weather data input from the inputting unit,
15 a combustion vibration region estimating unit which applies a limiting value of the internal pressure variation to the mathematical model obtained by the internal pressure variation characteristic grasping unit to obtain combustion vibration-prone to be generated region, and an outputting
20 unit which outputs a combustion vibration region estimation result by the combustion vibration region estimating unit.

16. The plant according to claim 15, wherein the combustion vibration estimating apparatus further comprises a database
25 which stores the plant data and the weather data input by

the inputting unit into a time series, wherein the internal pressure variation characteristic grasping unit obtains data from the database to make the internal pressure variation of the combustor into the mathematical model.

5

17. A plant comprising:

a combustor, and

a combustion vibration estimating apparatus having an inputting unit which inputs plant data and weather data
10 obtained with combustion in the combustor, an internal pressure variation estimating unit which estimates internal pressure variation of the combustor from the plant data and weather data which are input from the inputting unit, and an outputting unit which outputs internal pressure variation
15 estimation result estimated by the internal pressure variation estimating unit.

18. The plant according to claim 17, wherein the combustion vibration estimating apparatus further comprises a database
20 which stores the plant data and weather data input by the inputting unit, wherein the internal pressure variation estimating unit estimates the estimated value of the internal pressure variation by data of latest time stored in the database.

25

19. A plant comprising:

a combustor, and

a combustion vibration estimating apparatus which constructs a mathematical model which explains internal pressure variation and an NOx discharge amount from plant data and weather data which are obtained with combustion in the combustor, and obtains and outputs a combustion vibration-prone to be generated region and a combustion vibration-less prone to be generated region based on the constructed mathematical model.

20. A plant comprising:

a combustor, and

a combustion vibration estimating apparatus having an inputting unit which inputs limiting values of plant data, weather data obtained with combustion in the combustor and internal pressure variation, as well as a restricting value of NOx, an internal pressure variation characteristic grasping unit which makes internal pressure variation of a combustor into a mathematical model from the plant data and weather data input from the inputting unit, a NOx discharge amount characteristic grasping unit which makes an NOx discharge amount into a mathematical model from the input plant data and weather data input from the inputting unit, a safe region estimating unit which applies a limiting

value of the internal pressure variation to the mathematical model obtained by the internal pressure variation characteristic grasping unit, and applies a restricting value of the NOx to the mathematical model obtained by the NOx discharge amount characteristic grasping unit, thereby obtaining a region where the NOx discharge amount is equal to or less than the restricting value and the combustion vibration is less prone to be generated, and an outputting unit which outputs a safe region estimation result by the safe region estimating unit.

21. A plant comprising:
a combustor, and
a combustion vibration estimating apparatus which constructs a mathematical model for explaining internal pressure variation, NOx and a CO discharge amount from plant data and weather data obtained with combustion in the combustor, a combustion vibration-prone to be generated region and a combustion vibration-less prone to be generated region are obtained based on the constructed mathematical model and are output.

22. A plant comprising:
a combustor, and
a combustion vibration estimating apparatus having

an inputting unit which inputs limiting values of plant data, weather data obtained with combustion in the combustor and internal pressure variation, as well as restricting values of NOx and CO, an internal pressure variation characteristic grasping unit which makes internal pressure variation of a combustor into a mathematical model from the plant data and weather data input by the inputting unit, a NOx discharge amount characteristic grasping unit which makes an NOx discharge amount into a mathematical model from the plant data and weather data input by the inputting unit, a CO discharge amount characteristic grasping unit which makes an CO discharge amount into a mathematical model from the plant data and weather data input by the inputting unit, a safe region estimating unit which applies a limiting value of the internal pressure variation to the mathematical model obtained by the internal pressure variation characteristic grasping unit, applies a restricting value of the NOx to the mathematical model obtained by the NOx discharge amount characteristic grasping unit, and applies a restricting value of the CO to the mathematical model obtained by the CO discharge amount characteristic grasping unit, thereby obtaining a region where the NOx discharge amount and the CO discharge amount are equal to or less than the restricting value and the combustion vibration is less prone to be generated, and an outputting unit which outputs a safe region

estimation result by the safe region estimating unit.

23. A plant comprising:

a combustor, and

5 a combustion vibration estimating apparatus having
inputting unit which inputs limiting values of plant data,
weather data obtained with combustion in the combustor and
internal pressure variation, as well as restricting values
of NOx and CO, a focus setting unit which selects data used
10 for making a mathematical model from the plant data and
weather data input by the inputting unit, an internal
pressure variation characteristic grasping unit which makes
internal pressure variation of a combustor into a
mathematical model from the plant data and weather data
15 selected by the focus setting unit, a discharge amount
characteristic grasping unit which makes NOx and CO discharge
amounts into a mathematical model from the plant data and
weather data selected by the focus setting unit, a safe region
estimating unit which applies a limiting value of the
20 internal pressure variation to the mathematical model
obtained by the internal pressure variation characteristic
grasping unit, applies restricting values of the NOx and
CO to the mathematical models obtained by the NOx and CO
discharge amount characteristic grasping unit, thereby
25 obtaining a region where the NOx discharge amount and the

CO discharge amount are equal to or less than the restricting value and the combustion vibration is less prone to be generated, and an outputting unit which outputs a safe region estimation result by the safe region estimating unit.

5

24. The plant according to claim 23, wherein the focus setting unit selects the plant data and weather data input from the inputting unit based on a region or a setting mode designated by the inputting unit.

10

25. A plant comprising:

a combustor, and

a combustion vibration estimating apparatus having
an inputting unit which inputs limiting values of plant data,
15 weather data obtained with combustion in the combustor and
internal pressure variation, as well as restricting values
of NOx and CO, a focus setting unit which selects data used
for making a mathematical model from the plant data and
weather data input by the inputting unit, an internal
20 pressure variation characteristic grasping unit which makes
internal pressure variation of a combustor into a
mathematical model from the plant data and weather data
selected by the focus setting unit, a discharge amount
characteristic grasping unit which makes NOx and CO discharge
25 amounts into a mathematical model from the plant data and

weather data selected by the focus setting unit, a safe region
estimating unit which applies a limiting value of the
internal pressure variation to the mathematical model
obtained by the internal pressure variation characteristic
5 grasping unit, applies restricting values of the NOx and
CO to the mathematical models obtained by the NOx and CO
discharge amount characteristic grasping unit, thereby
obtaining a region where the NOx discharge amount and the
CO discharge amount are equal to or less than the restricting
10 value and the combustion vibration is less prone to be
generated, a proposed adjustment generating unit which
obtains a point to be measured next, using a safe region
estimation result by the safe region estimating unit, and
an outputting unit which outputs a safe region estimation
15 result by the safe region estimating unit and a point to
be measured by the proposed adjustment generating unit.

26. The plant according to claim 25, wherein the focus
determining unit determines a next focus based on the
20 mathematical model obtained based on plant data and weather
data selected by determination of a last focus.

27. A gas turbine plant comprising:
a gas turbine having a combustor, a compressor for
25 supplying compressed air to the combustor, an inlet guide

blade for supplying air to the compressor, a turbine which is connected to the compressor and is rotated by emission gas of the combustor, a main fuel flow rate control valve for controlling a main flame fuel supply amount which is
5 main flame of combustion in the combustor, a pilot fuel flow rate control valve for controlling a pilot flame fuel supply amount which holds the main flame, and a combustor bypass valve for supplying, to the turbine, the compressed air supplied from the compressor without through the combustor,
10 and

a combustion vibration estimating apparatus which constructs a mathematical model which explains internal pressure variation from plant data and weather data which are obtained with combustion in the combustor, and obtains
15 and outputs a combustion vibration-prone to be generated region and a combustion vibration-less prone to be generated region based on the constructed mathematical model.

28. A gas turbine plant comprising:

20 a gas turbine having a combustor, a compressor for supplying compressed air to the combustor, an inlet guide blade for supplying air to the compressor, a turbine which is connected to the compressor and is rotated by emission gas of the combustor, a main fuel flow rate control valve
25 for controlling a main flame fuel supply amount which is

main flame of combustion in the combustor, a pilot fuel flow rate control valve for controlling a pilot flame fuel supply amount which holds the main flame, and a combustor bypass valve for supplying, to the turbine, the compressed air
5 supplied from the compressor without through the combustor, and

a combustion vibration estimating apparatus having an inputting unit which inputs limiting values of plant data, weather data and internal pressure variation obtained with
10 combustion in the combustor, an internal pressure variation characteristic grasping unit which makes internal pressure variation of a combustor into a mathematical model from the plant data and weather data input from the inputting unit, a combustion vibration region estimating unit which applies
15 a limiting value of the internal pressure variation to the mathematical model obtained by the internal pressure variation characteristic grasping unit to obtain combustion vibration-prone to be generated region, and an outputting unit which outputs a combustion vibration region estimation
20 result by the combustion vibration region estimating unit.

29. The gas turbine plant according to claim 28, wherein the combustion vibration estimating apparatus further comprises a database which stores the plant data and the
25 weather data input by the inputting unit into a time series,

wherein the internal pressure variation characteristic grasping unit obtains data from the database to make the internal pressure variation of the combustor into the mathematical model.

5

30. A gas turbine plant comprising:

a gas turbine having a combustor, a compressor for supplying compressed air to the combustor, an inlet guide blade for supplying air to the compressor, a turbine which
10 is connected to the compressor and is rotated by emission gas of the combustor, a main fuel flow rate control valve for controlling a main flame fuel supply amount which is main flame of combustion in the combustor, a pilot fuel flow rate control valve for controlling a pilot flame fuel supply
15 amount which holds the main flame, and a combustor bypass valve for supplying, to the turbine, the compressed air supplied from the compressor without through the combustor, and

a combustion vibration estimating apparatus having
20 an inputting unit which inputs plant data and weather data obtained with combustion in the combustor, an internal pressure variation estimating unit which estimates internal pressure variation of the combustor from the plant data and weather data which are input from the inputting unit, and
25 an outputting unit which outputs internal pressure variation

estimation result estimated by the internal pressure variation estimating unit.

31. The gas turbine plant according to claim 30, wherein
5 the combustion vibration estimating apparatus further comprises a database which stores in the time series the plant data and weather data input by the inputting unit, wherein the internal pressure variation estimating unit estimates the estimated value of the internal pressure
10 variation by data of latest time stored in the database.

32. A gas turbine plant comprising:

a gas turbine having a combustor, a compressor for supplying compressed air to the combustor, an inlet guide
15 blade for supplying air to the compressor, a turbine which is connected to the compressor and is rotated by emission gas of the combustor, a main fuel flow rate control valve for controlling a main flame fuel supply amount which is main flame of combustion in the combustor, a pilot fuel flow
20 rate control valve for controlling a pilot flame fuel supply amount which holds the main flame, and a combustor bypass valve for supplying, to the turbine, the compressed air supplied from the compressor without through the combustor,
and
25 a combustion vibration estimating apparatus which

constructs a mathematical model which explains internal pressure variation and an NOx discharge amount from plant data and weather data which are obtained with combustion in the combustor, and obtains and outputs a combustion vibration-prone to be generated region and a combustion vibration-less prone to be generated region based on the constructed mathematical model.

33. A gas turbine plant comprising:

10 a gas turbine having a combustor, a compressor for supplying compressed air to the combustor, an inlet guide blade for supplying air to the compressor, a turbine which is connected to the compressor and is rotated by emission gas of the combustor, a main fuel flow rate control valve
15 for controlling a main flame fuel supply amount which is main flame of combustion in the combustor, a pilot fuel flow rate control valve for controlling a pilot flame fuel supply amount which holds the main flame, and a combustor bypass valve for supplying, to the turbine, the compressed air
20 supplied from the compressor without through the combustor, and

a combustion vibration estimating apparatus having an inputting unit which inputs limiting values of plant data, weather data obtained with combustion in the combustor and
25 internal pressure variation, as well as a restricting value

of NOx, an internal pressure variation characteristic grasping unit which makes internal pressure variation of a combustor into a mathematical model from the plant data and weather data input from the inputting unit, a NOx discharge amount characteristic grasping unit which makes an NOx discharge amount into a mathematical model from the input plant data and weather data input from the inputting unit, a safe region estimating unit which applies a limiting value of the internal pressure variation to the mathematical model obtained by the internal pressure variation characteristic grasping unit, and applies a restricting value of the NOx to the mathematical model obtained by the NOx discharge amount characteristic grasping unit, thereby obtaining a region where the NOx discharge amount is equal to or less than the restricting value and the combustion vibration is less prone to be generated, and an outputting unit which outputs a safe region estimation result by the safe region estimating unit.

34. A gas turbine plant comprising:

a gas turbine having a combustor, a compressor for supplying compressed air to the combustor, an inlet guide blade for supplying air to the compressor, a turbine which is connected to the compressor and is rotated by emission gas of the combustor, a main fuel flow rate control valve

for controlling a main flame fuel supply amount which is
main flame of combustion in the combustor, a pilot fuel flow
rate control valve for controlling a pilot flame fuel supply
amount which holds the main flame, and a combustor bypass
5 valve for supplying, to the turbine, the compressed air
supplied from the compressor without through the combustor,
and

a combustion vibration estimating apparatus which
constructs a mathematical model for explaining internal
10 pressure variation, NOx and a CO discharge amount from plant
data and weather data obtained with combustion in the
combustor, a combustion vibration-prone to be generated
region and a combustion vibration-less prone to be generated
region are obtained based on the constructed mathematical
15 model and are output.

35. A gas turbine plant comprising:

a gas turbine having a combustor, a compressor for
supplying compressed air to the combustor, an inlet guide
20 blade for supplying air to the compressor, a turbine which
is connected to the compressor and is rotated by emission
gas of the combustor, a main fuel flow rate control valve
for controlling a main flame fuel supply amount which is
main flame of combustion in the combustor, a pilot fuel flow
25 rate control valve for controlling a pilot flame fuel supply

amount which holds the main flame, and a combustor bypass valve for supplying, to the turbine, the compressed air supplied from the compressor without through the combustor, and

5 a combustion vibration estimating apparatus having an inputting unit which inputs limiting values of plant data, weather data obtained with combustion in the combustor and internal pressure variation, as well as restricting values of NOx and CO, an internal pressure variation characteristic
10 grasping unit which makes internal pressure variation of a combustor into a mathematical model from the plant data and weather data input by the inputting unit, a NOx discharge amount characteristic grasping unit which makes an NOx discharge amount into a mathematical model from the plant
15 data and weather data input by the inputting unit, a CO discharge amount characteristic grasping unit which makes an CO discharge amount into a mathematical model from the plant data and weather data input by the inputting unit, a safe region estimating unit which applies a limiting value
20 of the internal pressure variation to the mathematical model obtained by the internal pressure variation characteristic grasping unit, applies a restricting value of the NOx to the mathematical model obtained by the NOx discharge amount characteristic grasping unit, and applies a restricting
25 value of the CO to the mathematical model obtained by the

CO discharge amount characteristic grasping unit, thereby obtaining a region where the NOx discharge amount and the CO discharge amount are equal to or less than the restricting value and the combustion vibration is less prone to be generated, and an outputting unit which outputs a safe region estimation result by the safe region estimating unit.

36. A gas turbine plant comprising:

a gas turbine having a combustor, a compressor for supplying compressed air to the combustor, an inlet guide blade for supplying air to the compressor, a turbine which is connected to the compressor and is rotated by emission gas of the combustor, a main fuel flow rate control valve for controlling a main flame fuel supply amount which is main flame of combustion in the combustor, a pilot fuel flow rate control valve for controlling a pilot flame fuel supply amount which holds the main flame, and a combustor bypass valve for supplying, to the turbine, the compressed air supplied from the compressor without through the combustor, and

a combustion vibration estimating apparatus having an inputting unit which inputs limiting values of plant data, weather data obtained with combustion in the combustor and internal pressure variation, as well as restricting values of NOx and CO, a focus setting unit which selects data used

for making a mathematical model from the plant data and weather data input by the inputting unit, an internal pressure variation characteristic grasping unit which makes internal pressure variation of a combustor into a mathematical model from the plant data and weather data selected by the focus setting unit, a discharge amount characteristic grasping unit which makes NOx and CO discharge amounts into a mathematical model from the plant data and weather data selected by the focus setting unit, a safe region estimating unit which applies a limiting value of the internal pressure variation to the mathematical model obtained by the internal pressure variation characteristic grasping unit, applies restricting values of the NOx and CO to the mathematical models obtained by the NOx and CO discharge amount characteristic grasping unit, thereby obtaining a region where the NOx discharge amount and the CO discharge amount are equal to or less than the restricting value and the combustion vibration is less prone to be generated, and an outputting unit which outputs a safe region estimation result by the safe region estimating unit.

37. The gas turbine plant according to claim 36, wherein the focus setting unit selects the plant data and weather data input from the inputting unit based on a region or a setting mode designated by the inputting unit.

38. A gas turbine plant comprising:

a gas turbine having a combustor, a compressor for supplying compressed air to the combustor, an inlet guide blade for supplying air to the compressor, a turbine which is connected to the compressor and is rotated by emission gas of the combustor, a main fuel flow rate control valve for controlling a main flame fuel supply amount which is main flame of combustion in the combustor, a pilot fuel flow rate control valve for controlling a pilot flame fuel supply amount which holds the main flame, and a combustor bypass valve for supplying, to the turbine, the compressed air supplied from the compressor without through the combustor, and

a combustion vibration estimating apparatus having an inputting unit which inputs limiting values of plant data, weather data obtained with combustion in the combustor and internal pressure variation, as well as restricting values of NOx and CO, a focus setting unit which selects data used for making a mathematical model from the plant data and weather data input by the inputting unit, an internal pressure variation characteristic grasping unit which makes internal pressure variation of a combustor into a mathematical model from the plant data and weather data selected by the focus setting unit, a discharge amount characteristic grasping unit which makes NOx and CO discharge

amounts into a mathematical model from the plant data and weather data selected by the focus setting unit, a safe region estimating unit which applies a limiting value of the internal pressure variation to the mathematical model
5 obtained by the internal pressure variation characteristic grasping unit, applies restricting values of the NOx and CO to the mathematical models obtained by the NOx and CO discharge amount characteristic grasping unit, thereby obtaining a region where the NOx discharge amount and the
10 CO discharge amount are equal to or less than the restricting value and the combustion vibration is less prone to be generated, a proposed adjustment generating unit which obtains a point to be measured next, using a safe region estimation result by the safe region estimating unit, and
15 an outputting unit which outputs a safe region estimation result by the safe region estimating unit and a point to be measured by the proposed adjustment generating unit.

39. The gas turbine plant according to claim 38, wherein
20 the focus determining unit determines a next focus based on the mathematical model obtained based on plant data and weather data selected by determination of a last focus.